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09/928,766

08/13/2001

Hagai Aronowitz

INTL-0608-US (P11749)

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09/13/2005

Timothy N. Trop  
TROP, PRUNER & HU, P.C.  
8554 KATY FWY, STE 100  
HOUSTON, TX 77024-1805

EXAMINER

WOZNIAK, JAMES S

ART UNIT

PAPER NUMBER

2655

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/928,766

**Applicant(s)**

ARONOWITZ, HAGAI

**Examiner**

James S. Wozniak

**Art Unit**

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5, 11-15 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 11-15 and 27-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

1. In response to the office action from 4/29/2005, the applicant has submitted an amendment, filed 6/30/2005, amending claims 1, 11, 27, and 29, while canceling claims 6-10 and 16-26 and arguing to traverse the art rejection based on the limitation regarding a signal portion including a signal attribute and noise (*Amendment, Page 6*). Applicant's arguments have been fully considered, however the previous rejection is maintained due to the reasons listed below in the response to arguments.

### *Response to Arguments*

2. Applicant's arguments have been fully considered but they are not persuasive for the following reasons:

With respect to **Claim 1**, the applicant argues that the cited art fails to teach identifying signal attributes and noise attributes within a signal portion (*Amendment, Page 6*), however the examiner notes that Tzirkel-Hancock teaches input frames that contain an identified speech signal portion and a background noise portion (*Col. 12, Lines 37-46*). The examiner also points out that the distance measure derived by Tzirkel-Hancock for *input words* containing speech and noise attributes utilizes speech signal parameters of word portions (*signal portions*) that contain speech and noise, as required by the current claim language (*Col. 16, Lines 36-60*). Therefore,

since Tzirkel teaches a distance measure utilizing speech signal attributes of input *words* that contain identified speech and noise portions, claim 1 remains rejected.

With respect to **Claims 11, 27, and 29**, see the response to arguments in regards to Claim 1.

The dependent claims further limit rejected independent claims, and thus, also remain rejected.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1, 11, and 27** are rejected under 35 U.S.C. 102(b) as being anticipated by Tzirkel-Hancock (*U.S. Patent: 5,960,395*).

With respect to **Claims 1, 11, and 27**, Tzirkel-Hancock discloses:

Receiving, for speaker recognition, target speech data (*Col. 16, Lines 11-35, and method use in speaker dependent recognition, Col. 1, Lines 15-25*);

Selecting a pair of distinct signal portions of said speech data each including a signal attribute and noise (*frame pairs, Col. 16, Lines 36-50; Col. 13, Lines 37-41*);

Identifying, for each portion primarily signal attributes and primarily noise attributes (identifying speech and noise frames (*Col. 13, Lines 37-41*);

Deriving a distance measure for one signal portion by using the primarily signal attributes of both signal portions including noise attributes (*distance between two speech frame pairs, Col. 16, Lines 36-60*).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 2-4, 12-14, and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzirkel-Hancock in view of Porter (*U.S. Patent: 4,933,973*).

With respect to **Claim 2 and 12**, Tzirkel-Hancock teaches the method for distance comparison between speech frame pairs, as applied to Claim 1. Although Tzirkel-Hancock teaches the identification of speech and noise portions, a means of computing a relative noise measure for noise within a speech frame by distributing the speech signals over two speech signal frames is not taught by the prior art of record, however Porter teaches the averaging of a speech frame pair and the subsequent calculation of an average noise level (*Col. 10, Lines 30-51*).

Tzirkel-Hancock and Porter are analogous art because they are from a similar field of endeavor in speech recognition systems. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Tzirkel-Hancock

with the averaging of a speech frame pair and the subsequent calculation of an average noise level to provide necessary pre-processing for subsequent noise compensation to implement more accurate speech recognition in the presence of noise (Porter, Col. 16, Lines 24-29).

With respect to **Claims 3, 13, and 28**, Porter additionally recites:

Combining the signal attributes of the at least two signal portions into a signal content and combining the signal and noise attributes of the at least two signal portions into a signal and noise content (*relative energy and speech and noise level tracker*, Col. 10, Line 30- Col. 11, Line 4; and Fig. 2, Elements 25-26).

Calculating a compensation ratio of the signal and noise content to the signal content in order to derive the relative noise measure (signal to noise ratio, Col. 8, Lines 11-18); and

Adjusting a mismatch indicative of a noise differential between the noise components present in the training speech data and the noise attributes present in the at least two signal portions based on the relative noise measure (*modifying training speech data*, Col. 8, Lines 19-22).

With respect to **Claims 4 and 14**, Porter further recites:

Deriving from a training template, a signal profile based on a model trained on the training speech data to determine the mismatch between the noise components and the noise attributes (training template, Col. 7, Lines 59-68).

7. **Claims 5 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tzirkel-Hancock in view of Porter, and further in view of Yamaguchi et al (*U.S. Patent: 6,026,359*)

With respect to **Claims 5 and 15**, Tzirkel Hancock in view of Porter teaches the method and system for speech model compensation according to a noise level, as applied to Claim 3. Tzirkel-Hancock in view of Porter does not specifically suggest the use of parallel model combination, however Yamaguchi discloses such a method (*(noisy speech HMM is comprised of a combination of a clean speech HMM and a noise HMM, Element 5, a combination that is well known in the art as parallel model combination, Col. 1, Lines 53-55)*).

Tzirkel-Hancock, Porter, and Yamaguchi are analogous art because they are from a similar field of endeavor in speech recognition systems. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Tzirkel-Hancock in view of Porter with the use of parallel model combination as taught by Yamaguchi in order to provide an efficient means of quickly adapting recognition models to changing background noise to improve speech recognition accuracy (*Yamaguchi, Col. 2, Lines 20-28*).

8. **Claims 29-30** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tzirkel-Hancock in view of Eberman et al (*U.S. Patent: 5,924,065*).

With respect to **Claim 29**, Tzirkel-Hancock teaches the speech signal processing method utilizing a storage medium as applied to Claim 1. Tzirkel-Hancock does not teach method use in a wireless device, however Eberman teaches such an embodiment (*Col. 4, Lines 26-30; Col. 8, Lines 55-65*).

Tzirkel-Hancock and Eberman are analogous art because they are from a similar field of endeavor in speech signal processing. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Tzirkel-Hancock with the use

Art Unit: 2655

of noise compensation in a wireless device or in a speaker adaptation system as taught by Eberman in order to provide robust speech processing in a cellular environment (*Eberman, Col. 1, Lines 22-31*).

With respect to **Claim 30**, Eberman teaches the cellular communication network as applied to Claim 29.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:



Hayata et al (*U.S. Patent: 5,819,218*)- teaches the detection of a change in an audio signal for updating background noise.

Hindelang et al (*U.S. Patent: 6,233,708*)- teaches a difference calculation utilizing speech signal energy from two adjacent frames.

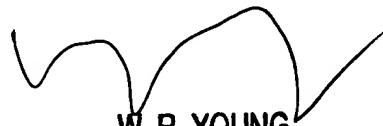
Wu et al (*U.S. Patent: 6,272,460*)- teaches a noise suppressor that calculates a spectrum difference between frames.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak  
8/4/2005

  
**W. R. YOUNG**  
**PRIMARY EXAMINER**